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ABSTRACT

The state-funded New York City Staff Development Program in Mathematics was a five-workshop series serving bilingual/English-as-a-Second-Language teachers teaching mathematics, and mathematics teachers unfamiliar with the special needs of limited-English-proficient (LEP) high school students. Supervisors were also invited to participate. Workshop topics included the relationship between language and mathematics, the relationship between students' cognitive styles and mathematics learning, and improved ways to prepare LEP students to pass the state competency test in mathematics. Participants evaluated the workshops by questionnaire. The objective that 90% of participants would be highly satisfied with each aspect of the workshops was not met, but 81% indicated a high level of satisfaction. The program was well planned, well implemented, and appeared to meet a real and significant need. Follow-up conferences to reflect on and discuss implementation of techniques and strategies are recommended. (Author/MSE)

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EVALUATION SECTION REPORT

THE NEW YORK CITY STAFF DEVELOPMENT PROGRAM IN MATHEMATICS FOR HIGH SCHOOL TEACHERS AND SUPERVISORS 1987-1988

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EVALUATION SECTION
John E. Schoener, Chief Administrator
April 1989

EVALUATION SECTION REPORT

THE NEW YORK CITY STAFF DEVELOPMENT PROGRAM IN MATHEMATICS FOR HIGH SCHOOL TEACHERS AND SUPERVISORS 1987-1988

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5/22/89

THE NEW YORK CITY STAFF DEVELOPMENT PROGRAM IN MATHEMATICS* 1987-88

SUMMARY

- The New York City Staff Development Program In Mathematics was fully implemented. During the 1987-1988 school year, 178 bilingual/English as a Second Language (E.S.L.) teachers and supervisors who teach mathematics and mathematics teachers unfamiliar with limited English proficient (LEP) students learned instructional techniques and strategies for teaching mathematics to LEP students.

Funded by the New York State Education Department (N.Y.S.E.D.), the New York City Staff Development Program in Mathematics was a five-part workshop series offered to meet the staff development needs of two distinct populations in the City's academic and vocational high schools: those who were teaching math out-of-license, and trained mathematics teachers who were unfamiliar with the special needs of high school LEP students. Supervisors were also invited to participate in the workshop series.

Training was provided at five three-hour workshops spaced over five months at two alternating sites. The workshops used a variety of presentation styles, including lectures, hands-on activities, discussions, and the distribution of topical handouts. The topics at these workshops included the relationship between language and mathematics; the relationship between students' cognitive styles and mathematics learning; and improved ways to prepare LEP students to pass the Regents Competency Test in Mathematics.

Participants evaluated each workshop using forms developed by the Bilingual/E.S.L. Unit of the Division of High Schools in consultation with the Office of Research, Evaluation, and Assessment. Participants rated their satisfaction with the clarity, scope, thoroughness, and usefulness of the workshops.

The director of the Bilingual/E.S.L. Unit had overall responsibility for the program, while implementation of program activities was the responsibility of the unit's staff under the supervision of the program coordinator. The latter hired consultants to make presentations; recruited, selected, and assigned participants to workshops; determined the content and

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*This summary is based on the final evaluation of "The New York City Staff Development in Mathematics 1987-88" prepared by the OREA Bilingual Education Evaluation Unit.

format of the sessions; and made provisions for completing the necessary paperwork.

The objective that 90 percent of the participants would be highly satisfied with each aspect of the workshops was not met, but 81 percent of the participants indicated a high level of satisfaction. A possible reason for this a low level of response to one of the questions (willingness to do follow-up training), thereby affecting the outcome on the variable.

The program had many strengths. It was well planned, well implemented, and appeared to meet a real and significant need. The two sites were conveniently located; sessions were held at convenient times.

The conclusions, based on the findings of this evaluation, lead to the following recommendation:

- Follow-up conferences would give participants an additional professional setting in which to reflect upon and discuss implementation of techniques and strategies learned in the workshop series.

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I. OVERVIEW

There is increasing evidence that high school students of limited English proficiency (LEP) are failing to acquire basic competencies in mathematics. According to one official of the New York State Education Department (N.Y.S.E.D.), language-minority students of all national backgrounds are generally failing to pass the Regents Competency Test (R.C.T.) in mathematics.

The problem is not limited to students' innumeracy; due to a severe shortage of mathematics teachers, these courses are often being taught out-of-license, and the teachers assigned to them are less able to communicate in the specialty area or to transmit the necessary skills and knowledge to help students become mathematically proficient. This dual problem--mathematical illiteracy at both the student and teacher levels--is even more acute for LEP students, who must also contend with the additional barrier of language.

To remedy this situation, the Bilingual/E.S.L. Unit ("the Unit") of the Division of High Schools designed a short-term staff development intervention to increase teachers' knowledge and skills in dealing with LEP students. With funds from N.Y.S.E.D., the Unit offered a five-part workshop series to meet the staff development needs of two distinct populations in the city's academic and vocational high schools: teachers teaching math out-of-license, and trained mathematics teachers unfamiliar with the special needs of high school LEP students.

In addition to teachers, supervisors were also invited to participate in the workshop series. This created a diverse audience and a great deal of cross-level discussion. Attendance at all five sessions was encouraged but not mandatory; in fact, a number of participants were able to attend only one session.

PROGRAM DESIGN

The program provided training at five three-hour workshops spaced over five months at two alternating sites. Three workshops were held after school hours in a high school library. The remaining two workshops took place at a four-year college located on Manhattan's Upper East Side.

Both sites were relatively well-situated, located near public transportation for easy access. Training at the high school site was offered from 2:30 P.M. to 5:30 P.M.; training at the college site took place on Saturday from 9 A.M. until 1 P.M. The topics at these workshops included the relationship between language and mathematics, the relationship between students' cognitive styles and mathematics learning; and ways to prepare LEP students to pass the R.C.T. in mathematics. The workshops used a variety of presentation styles, including lectures, hands-on activities, discussions, and the distribution of topical handouts. A brief summary of each workshop follows in Section III, including a description of techniques and methods used by the presenters.

PROGRAM ORGANIZATION

The director of the Unit bore overall responsibility for the program, while implementation of program activities was the responsibility of the Unit's staff, under the supervision of the program coordinator. The latter hired consultants to make presentations; recruited, selected, and assigned participants to workshops; determined the content and format of the sessions; and made provisions for completing the necessary paperwork.

The Unit publicized the program by distributing a memorandum to all 32 New York City community school districts (C.S.D.s). The memorandum described the program; provided information about pre-registration requirements and the stipend for participation; and noted dates, times, and locations of the workshops.

Participants evaluated each workshop using forms developed by the Unit in consultation with the Office of Research, Evaluation, and Assessment. Participants were asked to assess their satisfaction level with the clarity, scope, thoroughness, and utility of the workshops; they also completed a background questionnaire.

II. WORKSHOP DESCRIPTIONS

The Staff Development Program in Mathematics was held at alternating sites: a high school library in lower Manhattan; and a seminar room in a local public college on the Upper West Side. The program consisted of five workshops organized into three independent segments. The overriding purpose of these workshops was to familiarize teachers and other educational personnel with effective instructional practices in the area of mathematics, to be used with LEP high school students. Presenters used a combination of lectures, discussion, and hands-on activities to inform and engage the participants. Participation was open to teachers and other educational personnel working with LEP students in any of the five boroughs. Officials from the New York City Board of Education and N.Y.S.E.D. were always present: first, in their capacity as co-hosts; second, as presenters of the project's purpose; lastly, as participant-observers.

Each training segment is summarized separately below.

First Segment: Workshops I and II

Dr. Gilberto Cuevas, a math educator, conducted the first segment, which addressed the relationship between mathematics and language. His workshops, spaced a month apart, were entitled: "Am I communicating?" and "Solving Word Problems." They were well attended and marked by great interest and participation.

Dr. Cuevas briefly presented three recent trends in mathematics education research. He lectured on the substance of

mathematics education; namely, that mathematics education is largely conceived of as computation. Second, he introduced the idea that mathematics is also a verbal activity, requiring the use of a specialized vocabulary. Dr. Cuevas divided up participants into small groups in order to analyze a predesigned lesson in terms of its verbal content and specialized vocabulary. A materials folder was distributed.

The second workshop focused on how to use the teaching strategies Dr. Cuevas had shared in writing the month before. According to the most recent trends in mathematics education research, the strategies enhanced students' abilities to problem-solve and apply mathematical priciples. Once again he divided the participants into small groups and instructed them to select two strategies each; participants shared ideas as to how they would apply these strategies with typical students. Again, a prepared handout, this one containing word problems, was distributed and discussed.

Second Segment: Workshops III and IV

Drs. Anna Chamot and Michael O'Malley jointly presented the next two workshops. The two have developed a learning process model called CALLA (Cognitive Academic Language Learning Approach) that can be applied to a variety of student developmental levels, as well as to multiple curricular approaches. Teachers using CALLA learn to structure lessons in four parts: they design a lesson based on its content objectives, language objectives, materials, and language strategies. Fully

developed, a CALLA lesson involves a five-step process: preparation, presentation, practice, evaluation, and follow-up/expansion activities. The presenters used a combination of lecture and small-group discussion to familiarize the group with the model. They asked participants to try out the strategies in the interim period between the two workshops, and to bring resulting information to the second workshop. Presenters gave feedback to those who attempted the new approaches.

Third Segment: Workshop V

Dr. Frederick Paul, head of the N.Y.S.E.D.'s Bureau of Mathematics, was the featured speaker at the last segment. He presented an overview of the state's mandatory curriculum, and shared techniques on how to teach mathematics to prepare LEP students to pass the R.C.T. Dr. Paul fielded a considerable number of practical questions from the participants. He also shared practical advice on where to obtain curriculum materials.

III. FINDINGS

This report examines the extent to which the program achieved the goals and objectives outlined in the proposal to the N.Y.S.E.D. Data are based on the evaluation forms; observations conducted on-site at all five workshops; and formal interviews with the program director. Recommendations may aid others to plan and implement similar future efforts.

- Ninety percent of the participants will be highly satisfied (an average rating of three or above on a five-point Likert Scale) with the clarity, scope, thoroughness, and usefulness of the training sessions, will have a positive overall assessment of the sessions, and will indicate they had learned a significant amount.

The program met its primary goal of providing mathematics teachers and others who work with LEP students with techniques and methods to enhance the teaching of math to these students. The program attracted interest and participation from four boroughs and from different types of schools (vocational and comprehensive high schools).

The evaluation form asked participants to rate their prior knowledge of the topic, how well the presentation was organized, the presenter's level of knowledge, how well the presenter communicated the topic, the responsiveness of the presenter to audience needs, the adequacy of time allocated for discussion and questions, the applicability of the topic to the respondent's job, how much the respondent would be willing to recommend the presentation to others, how willing the respondent would be to

pay for followup training, and the respondent's new level of knowledge following the presentation.

Respondents indicated their answers to each of these variables on a five-point Likert scale. As written, the objective calls for a "4" or "5" on this scale to indicate the highest level of satisfaction, and for a "1" or "2" to indicate the lowest. But on the scale administered to the teachers, however, the order was reversed, such that "1" and "2" indicated the highest level of satisfaction, while "4" and "5" indicated the lowest. Although the mean rating for all the variables was a high 2.1, only 81.2 percent of the respondents indicated a high level of satisfaction (a rating of "2" or better, where "1" was the highest grading possible). Thus the 90 percent objective was not achieved.

In considering the failure to achieve the 90 percent objective, it may be that the proposed objective was set unrealistically high. Table 1 shows that the teachers' average satisfaction rating for most variables tended to be high ("2" or better). The low level of willingness to undergo followup training (mean=3.3; SD=1.4), coupled with the high level of willingness to recommend the workshops (mean=1.7; SD=1.0) indicates that the teachers were personally satisfied with the workshops as presented. A fraction (one-third) of those responding rated their willingness to do followup training. This may have affected the outcome on the variable.

TABLE 1

Teachers' Average Satisfaction Ratings of Workshops*

Satisfaction Variable	N	Mean Rating	SD
Organization of the Presentation	165	1.7	1.0
Presenter's Level of Knowledge	178	1.6	1.0
Effectiveness of Communications	173	1.6	1.0
Responsiveness of Presenter	170	1.7	1.0
Adequacy of Discussion Time	147	1.9	1.1
Applicability of Information	161	1.7	1.0
Willingness to Recommend Presentation	171	1.7	1.0
Willingness to Do Followup Training	63	3.3	1.4

* Rating Scale: Range = 1 to 5; 1=highest, 5=lowest.

IV. CONCLUSIONS AND RECOMMENDATIONS

• The 1987-88 New York City Mathematics Staff Development Program for Teachers and Supervisors working with LEP student populations was clearly successful. It was well planned, well implemented, and appeared to meet a real and significant need. The two sites were conveniently located; and the sessions were held at convenient times. Strong interest in the program was evident: organizers, presenters, and participants were enthusiastic about the program; there was positive interaction among presenters and participants. The director recommended that in the future, the series be lengthened and offered within each borough.

The conclusions, based on the findings of this evaluation, lead to the following recommendation:

- Follow-up conferences would give participants a chance to reflect upon what they learned and to discuss the implementation of techniques learned in the workshop series.